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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/614,673 | 07/04/2003 | Chin-Long Lin | 68146241-005009 | 7325 |
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| BAKER & MCKENZIE LLP PATENT DEPARTMENT 2001 ROSS AVENUE SUITE 2300 DALLAS, TX 75201 | | | EXAMINER REKSTAD, ERICK J | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/614,673 | Applicant(s) LIN ET AL. | |
| | Examiner Erick Rekstad | Art Unit 2621 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 and 30-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 and 30-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is a Final Rejection for application no. 10/614,673 in response to the amendment filed on April 11, 2007.

Response to Arguments

Applicant's arguments filed April 11, 2007 have been fully considered but they are not persuasive. The Applicant argues that US Patent 5,576,772 to Kondo does not teach "(a3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblocks, repeating step (a3) for all of said reference macroblocks in said search range". The Examiner respectfully disagrees.

As noted in the previous Office Action, the claim does not require the pixel units to be only based on two horizontally adjacent pixels. The claim broadly requires "based on averages of every two adjacent pixels as a pixel unit". This requirement does not state the pixel unit must be only based on the two adjacent pixels. Further, as presented, the claim could be read as requiring the pixel unit to be the averages of every two adjacent pixels in the macroblock. This is unsupported by the specification. Kondo specifically teaches the use of averages of two adjacent pixels as shown in Figure. 9B and the equation for m1 (Col 8 Line 67). Pixel X1 is adjacent to X2 and X5. Pixel X2 is adjacent to X1 and X6. Pixels X5 and X6 are also adjacent. Kondo, teaches the use of these values for determining a similarity between a reference macroblock and

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current macroblock (Col 9 Lines 16-42). The determining a similarity is repeated for all of the reference blocks in the search range (Col 10 Lines 19-37).

The Applicant further argues that US Patent 6,011,870 to Jeng does not teach the "determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and reference macroblocks".

Specifically, the Applicant states Jeng discloses calculating a motion vector based on every other vertically-neighboring pair of pixels as noted in citation (Col 8. Lines 34-36).

The Examiner respectfully disagrees.

Jeng teaches the use of an averaging module which can generate averaged pixels in three cases. As cited in the Previous Office Action, one of the cases is shown in Fig. 11A wherein neighboring pixels are averaged (Col 8 Lines 21-26). The Applicants argument related to the third case, where every other pixel is selected, does not overcome the fact that Jeng teaches the claimed step as shown in the first case.

It is suggested by the Examiner that the claims be amended to clearly define the determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in said selected current macroblock and said reference macroblocks. Wherein one calculated pixel unit is defined as the average of only two adjacent pixels.

Since the Applicant did not traverse the "Official Notice" by the Examiner, the common knowledge or well-known in the art statement is taken to be admitted prior art

because applicant either failed to traverse the examiner's assertion of official notice or that the traverse was inadequate.

Specification

The disclosure is objected to because of the following informalities: Equation 5 on Page 8 uses the undefined variable Sr.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, and 8-12 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,576,772 to Kondo.

[claim 1]

Kondo teaches a motion estimation method for estimating a motion vector between a reference image frame and a current image frame, each of said reference frame and said current frame being formed by a plurality of pixels (Abstract, Figs. 10a-e), the method comprising the steps of:

(a1) dividing a plurality of reference macroblocks each comprising a plurality of adjacent pixels within said reference frame, a set of said reference macroblocks forming a search range (Col 9 Line 58-63, Fig. 10a).

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(a2) dividing at least one current macroblock comprising a plurality of continuous pixels from said current frame, each of said reference macroblocks and said at least one current macroblock having generally the same size and shape with corresponding pixel distribution (Col 1 Lines 5-19, Col 2 Lines 10-14 and Lines 34-40, Figs. 2A and 4).

Note: Kondo's invention relates to an optimization of the motion vector detection in MPEG compression, therefore it would be inherent that Kondo's invention divides the frames into macroblocks as suggested by the citation above.

(a3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblocks (Col 6 Line 64-Col 7 Line 42, Col 8 Lines 23-26, Figs 6B and 9B). It is noted by the Examiner that the claim does not require the pixel units to be only based on two horizontally adjacent pixels therefore Kondo's teaching of a 2x2 block of pixels is viewed by the Examiner to satisfy the requirements of the claim.

(a4) repeating step (a3) for all of said reference macroblocks in said search range (Col 10 Lines 9-40, Fig. 10B);

(a5) determining a motion estimation of said current frame and said reference frame based on said respectively determined similarity in steps (a3) and (a4) (Col 10 Lines 41-67, Fig. 10C).

[claims 2, 3, 9 and 10]

Kondo further teaches the calculating an absolute difference of a pixel unit for every two adjacent pixels in said current macroblock and a corresponding pixel unit for

every two adjacent pixels in said reference macroblocks resulting in a plurality of calculated absolute differences; and

Summing said calculated absolute differences for all of said pixel units of said current macroblock (Col 9 Lines 16-33 and Lines 45-49)

Kondo teaches the determining a motion estimation vector between said selected current macroblock and one of said reference macroblocks within said search range having a smallest sum of said calculated absolute differences with said current macroblock (Col 2 Lines 43-51, Col 9 Lines 28-49, Col 10 Lines 19-28, Fig. 10D).

[claim 8]

As shown above from claim 1, Kondo teaches the requirements of steps (b1)-(b3). Kondo further teaches:

(b4) determining similarities for said first predetermined set of reference macroblocks in said search range for performing a coarse tune operation;

(b5) determining a preferred reference macroblock from said first predetermined reference macroblocks based on said similarities;

(b6) determining similarities for a second predetermined set of reference macroblocks around said preferred reference macroblock based on pixels of said current macroblock and said second predetermined set of reference macroblocks for performing a fine tune operation; and

(b7) determining a motion estimation of said current frame and said reference frame from said determined similarities in step (b6) (Col 6 Line 64-Col 7 Line 10, Col 10 Lines 9-67, Figs. 10B and 10C).

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[claims 11-12]

Kondo teaches the use of absolute difference of pixels between the current macroblock and a reference macroblock (Col 2 Lines 43-51 and Col 9 Lines 50-55).

Claims 1-3, 8-10, 21-26, 34, and 36-38 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,011,870 to Jeng et al.

[claims 1, 8, and 34]

Jeng teaches a motion estimation method for estimating a motion vector between a reference image frame and a current image frame, each of said reference frame and said current frame being formed by a plurality of pixels (Abstract), the method comprising the steps of:

(a1 and b1) dividing a plurality of reference macroblocks each comprising a plurality of adjacent pixels within said reference frame, a set of said reference macroblocks forming a search range (Col 10 Line 62-Col 11 Line 4).

(a2 and b2) dividing at least one current macroblock comprising a plurality of continuous pixels from said current frame, each of said reference macroblocks and said at least one current macroblock having generally the same size and shape with corresponding pixel distribution (Col 2 Lines 8-24, Col 10 Line 62-Col 11 Line 4). Note: Jeng's invention relates to an optimization of the motion vector detection in MPEG compression, therefore it would be inherent that Kondo's invention divides the frames into macroblocks as suggested by the citation above.

(a3 and b3) determining a similarity of one of said reference macroblocks and a selected one of said at least one current macroblock based on averages of every two

adjacent pixels as a pixel unit in said selected current macroblock and said reference macroblocks (Col 3 Lines 39-43, Col 8 Lines 12-26, Fig. 11a).

(a4) repeating step (a3) for all of said reference macroblocks in said search range (Col 5 Line 52-Col 6 Line 2);

(b4) determining similarities for said first predetermined set of reference macroblocks in said search range for performing a coarse tune operation;

(b5) determining a preferred reference macroblock from said first predetermined reference macroblocks based on said similarities;

(b6) determining similarities for a second predetermined set of reference macroblocks around said preferred reference macroblock based on pixels of said current macroblock and said second predetermined set of reference macroblocks for performing a fine tune operation; and

(a5 and b7) determining a motion estimation of said current frame and said reference frame from said determined similarities in step (b6) (Col 3 Lines 39-51, Col 10 Lines 42-52, Figs. 1 and 6).

As shown by the citations, Jeng teaches the use of the motion estimation for use with MPEG compression. MPEG compression inherently has the features of part (a) of claim 34. The remaining requirements (b)-(p) are equivalent to the requirements of claim 1 and therefore are rejected on the same grounds.

[claims 2, 3, 9 and 10]

Jeng teaches the use of sum of absolute differences (Abstract, Col 2 Lines 9-24).

[claims 21-26, and 36-38]

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Jeng further teaches the use of the method for fields or frames, where the frames are made up of even and odd lines (Col 3 Lines 17-38, Figs. 7A and 7B). The citation further shows the determining of a top field motion estimation and a bottom field motion estimation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo.

[claims 4, 5, 13 and 14]

As shown above for claims 3, 4, 9 and 10, Kondo teaches the use of SAD to determine the best match. Kondo further teaches the use of other calculating means such as sum of square differences (Col 2 Lines 43-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to use sum of square differences in place of SAD in the motion estimation process as Kondo teaches such an option is well known in the art (Col 2 Lines 43-51).

[claims 15 and 16]

As shown above for claims 11 and 12, Kondo teaches the use of absolute difference of pixels between the current macroblock and a reference macroblock. Kondo further teaches the use of other calculating means such as sum of square

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differences (Col 2 Lines 43-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to use sum of square differences in place of SAD in the motion estimation process as Kondo teaches such an option is well known in the art (Col 2 Lines 43-51).

Claims 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng.

[claims 27 and 33]

As shown in Figure 2, Jeng teaches the use of a motion estimation device comprising a controller (12), a first motion estimation processor (6, Fig. 1) and a second motion estimation processor (8, Fig. 1) (Col 2 Line 61- Col 3 Line 4, Col 4 Lines 12-27). The device is taught by Jeng to perform the steps as shown above for claim 8. Jeng teaches the controller obtains the video from other on-chip encoding circuitry, embedded imaging or video detection device integrated on-chip or equivalently coupled discretely thereto as separate digital video signal detection or generation appliance (Col 4 Lines 15-20). Jeng does not specifically teach the use of a frame buffer. It is well known in the art to use memory (SDRAM or DRAM) in order to buffer incoming images/video for processing (Official Notice). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a buffer in the system of Jeng in order to store images for processing.

[claims 28-32]

As shown above for claim 8, Jeng teaches the method for the device of claims 27-32.

Claims 6,7, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo as applied to claims 1 and 8 above, and further in view of US Patent 6,442,203 to Demos.

[claims 6, 7, 17 and 20]

As shown above Kondo teaches the requirements of claims 1 and 8. Kondo further teaches the use of SAD to determine motion vectors (Col 9 Lines 45-55). Kondo is silent on the use of multiplication.

Demos teaches the use of SAD to determine motion vectors (Col 12 Lines 28-42). Demos teaches an alternative to this method by using the AC correlation (Col 13 Lines 4-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the AC correlation method of Demos with the method of Kondo in order to detect objects moving into the light, or out of the light, or in fading conditions as taught by Demos (Col 13 Lines 4-15).

Claims 6,7, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng as applied to claims 1 and 8 above, and further in view of US Patent 6,442,203 to Demos.

[claims 6, 7, 17 and 20]

As shown above Jeng teaches the requirements of claims 1 and 8. Jeng further teaches the use of SAD to determine motion vectors (Abstract). Jeng is silent on the use of multiplication.

Demos teaches the use of SAD to determine motion vectors (Col 12 Lines 28-42). Demos teaches an alternative to this method by using the AC correlation (Col 13

Lines 4-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the AC correlation method of Demos with the method of Jeng in order to detect objects moving into the light, or out of the light, or in fading conditions as taught by Demos (Col 13 Lines 4-15).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick Rekstad whose telephone number is 571-272-7338. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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